

REMARKS

Initially, Applicants wish to make of record the results of a telephone inquiry to Examiner McCaig on April 6, 2009 as to which the Examiner indicated that the Williams et al article in *Fuel* 80 that is listed on the Form PTO-892 was cited by mistake and requires no comment by Applicants. Also, the “x” mark on item 10 of the “Office Action Summary” in connection with the drawing is a typographical error and requires no modification of the drawings.

It is respectfully requested that the rejection of claims 10-30, including new grounds of rejection, be reconsidered for the reasons hereinafter presented.

Rejection of Claims 10-14 and 19-24 as Anticipated Under 35 U.S.C. § 102

The Examiner has maintained the rejection of claims 10-14 and 19-24 under 35 U.S.C. § 102 as being anticipated by Evans et al, U.S. Patent No. 4,657,664 (“Evans et al”) despite the Federal Circuit decision in *Atofina v. Great Lakes Chem. Corp*, 441 F.3d 991, 999, 78 USPQ2d 1417, 1423 (Fed. Cir. 2006) in which the Federal Circuit held that a reference temperature range of 100-500°C did not describe the claimed range of 330-450°C with sufficient specificity to be anticipatory. Applicants rely on the decision in the *Atofina* case, since Evans et al do not describe the pressure range of 40 to 130 kg/cm² of claims 10-12 and 19-24 nor the pressure range of 45 to 90 kg/cm² of claims 13-14.

The Examiner distinguishes the *Atofina* decision in para. 21 of the Office Action on the ground that Evans et al discloses Applicants’ claimed invention with “sufficient specificity”, despite the fact that Evans et al’s sole data demonstrating testing of their invention in Examples 1-3 utilize pressures above Applicants’ claimed pressure range. Further, the Examiner gives no weight to such out-of-the-range evidence as a lack of anticipation by Evans et al on the ground that Examples 1 and 2 constitute an “extreme case” (emphasis added) in view of the “very heavy

hydrocarbons as evidenced by the API gravities, metal concentrations, and fractions boiling above 1000°F.”

It is submitted that to the contrary, it is the conversion of such “extreme” heavy hydrocarbon feedstocks using Applicants claimed low pressure process which demonstrate lack of anticipation by Evans et al. In this connection, reference is made to the following Table using the data from Examples 9 and 10 on pages 49-54 of Applicants’ own specification. The Table, below, summarizes the % conversion of vacuum residue having an API gravity *below* that of the “extreme” feedstock used in the Evans et al examples using an operational process pressure within Applicants’ claimed range as compared with use of pressure above the claimed range:

	Feed properties	Operating conditions	Product quality	Conversion, %
Example 9	Vacuum residue API Gravity=1.87 Sulfur=5.07 wt% Nitrogen=6200 wppm Asphaltene=25.46 wt% Metals=777.9 wppm (in table 21)	Temperature=400°C Pressure=100 kg/cm ² LHSV=0.25 h ⁻¹ (in table 22)	API Gravity =21.19 Sulfur=0.714 wt% Nitrogen=3800 wppm Asphaltene=3.67 wt% Metals=47 wppm Sediments=1.38 wt% Conversion =75.2 V% (in table 23)	HDS=85.92 HDN=38.70 HDAsp=85.58 HDM=93.58
Example 10	Vacuum residue API Gravity =3.73 Sulfur=4.507 wt% Nitrogen=6100 wppm Asphaltene=17.75 wt% Metals=502.6 wppm (in table 24)	Temperature=420°C Pressure=185 kg/cm ² LHSV=0.3 h ⁻¹ (in table 25)	API Gravity =18 Sulfur=2.12 wt% Nitrogen=3700 wppm Asphaltene=5.58 wt% Metals=68.4 wppm Sediments=1.0 wt% Conversion =71.9 V% (in table 26)	HDS=52.96 HDN=39.34 HDAsp=68.56 HDM=86.39

Thus, in the tests of Examples 9 and 10, a similar vacuum residue was tested at two different pressures, 100 and 185 kg/cm² respectively, under substantially similar conditions. The conversion of sulfur, nitrogen, asphaltenes and metals are also calculated. It is seen that by using a lower process pressure, sulfur, nitrogen, asphaltene and metal removals are 85.92%, 38.70%, 85.58% and 93.96%, respectively. However, when a higher pressure (185 kg/cm²) outside of the claimed range is used, the conversion results are 52.96%, 39.34%, 68.56% and 86.39 %, respectively.

The Comparative Examples demonstrate that use of lower pressure achieved improved sulfur, asphaltene and metal removal. It is also seen from the above Table that API gravity and total volumetric conversion are also higher at the lower operating pressure. These results are very significant, since use of lower process pressure presents fewer problems and is more cost effective than use of higher process pressures or higher temperatures.

Such results are contrary to the teaching of Evans et al who specifically state in column 12, lines 18-23 that the advantage of their two catalyst system is that it “can be operated at higher temperature which gives higher conversion and a higher quality product than can be obtained with the single catalyst system which is substantially more expensive.” (Emphasis added). Evans et al’s desired use of higher operating temperatures is contrary to Applicants’ lower pressure system, which is substantially less expensive to operate than Evans et al’s recommended higher temperature, higher pressure system.

Accordingly, use of higher pressures in the Examples of Evans et al coupled with the aforesaid Evans et al statements concerning the desired use of higher temperature to achieve improved conversion, refutes the proposition that Evans et al provide “sufficient specificity” as to anticipate Applicants’ claimed invention. Unlike the facts in the case of *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Cir. 1990) cited by the Examiner, in which *no evidence* was presented demonstrating that the claimed invention distinguished a composition of the reference, Applicants have provided evidence in the form of comparative examples coupled with the statements by patentees in Evans et al, which distinguishes the claimed invention of Applicants from that of Evans et al. Thus, Evans et al fails to provide “sufficient specificity” to anticipate the claimed invention by teaching away from Applicants’ claimed invention in their own comments and as demonstrated by the comparative conversions achieved in the foregoing Table.

Accordingly, it is submitted that the rejection of claims 10-14 and 19-24 as anticipated by Evans et al should be withdrawn.

Rejection of Claims 15-18 and 24 as Anticipated or Obvious

Claims 15-18 and 24 are rejected under 35 U.S.C. § 102(b) as anticipated by or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Evans et al.

Since claims 15-18 and 24 are ultimately dependent from claim 10 and contain additional limitations, such claims are not anticipated by Evans et al for the reasons given previously, which will not be repeated so as not to burden the record.

Likewise, claims 15-18 and 24 are unobvious over Evans et al, since as discussed above, Evans et al teach use of higher temperatures, not lower pressures to increase conversion. This fact coupled with the comparative showing presented in the above Table, demonstrates the unobvious use of lower operating pressures in the claimed range to significantly increase sulfur, asphaltene and metal removal. It is also seen from the above Table that improvement of API gravity and total volumetric conversion are higher at lower operating pressure compared with that achieved at higher operating pressure.

Moreover, claim 15 further distinguishes Evans et al by reciting that the claimed process minimizes formation of sediments and sludge to a maximum value of 0.65 % by weight of the hydrotreated hydrocarbon while using the lower process pressures in the claimed range. The only Example in Evans et al of a low solids value is shown in Table IV in column 11, in which the solids value was 0.63 which increased to 0.81 after a temperature increase, which levels were achieved at a pressure of 140 kg/cm², which is above the 40 to 130 kg/cm² range of claim 15.

For the foregoing reasons, it is requested that the rejection of claims 15-18 and 24 as being anticipated or unobvious be withdrawn.

Rejection of Claim 25-30 as being Obvious

Claims 25-28 and 30 are rejected as being obvious under 35 U.S.C. § 103(a) over Evans et al in view of Trueba et al. Claim 29 is not mentioned in the statement of the rejection; however, it is mentioned in the discussion of the rejection, so that it is assumed it was intended to be included.

The Examiner has taken the position that since Evans et al disclose use of an alumina support (col. 7, line 63, and Table I in col. 10), it would be obvious to use gamma alumina in view of Trueba et al, who discloses (p. 3393, first paragraph) as being “perhaps the most important with direct application as a catalyst and catalyst support in the petroleum industry” would make it obvious to use.

Claim 25 is dependent from claim 24, which recites use of a nickel-molybdenum as the hydrodemetallization catalyst. Neither Evans et al nor Trueba et al disclose use of a nickel-molybdenum catalyst on gamma-alumina or as a hydrodemetallization catalyst in the process of claim 10 from which claim 25 ultimately depends.

Trueba et al cannot cure the deficiencies of Evans et al. Trueba et al does not disclose use of a gamma alumina support for a hydrotreatment process. Accordingly, the disclosure of Trueba et al cannot render obvious the use of a gamma-alumina support for a nickel-molybdenum catalyst in the low pressure process of claim 10. Moreover, claims 27 and 29 require that the amount of sediment and sludge formed in *each* of the first and second reaction stages be less than 0.65% by weight of the hydrotreated hydrocarbon. Evans et al do not teach nor suggest that lower pressures could be used in each stage of a two-stage process to achieve solids formation *in each stage* well below the typical maximum commercial limit of 0.8 wt. %, namely, below 0.65 weight %, and the advantages of safety and cost realized by using such less severe conditions. Although solids formation of 0.63 and 0.81 are disclosed in Table IV for the two stage process of Example 1 using pressures above the claimed range, it is not disclosed in

Evans et al what the solids formation for *each* stage A or B is achieved. By contrast, Table 13 of the present application illustrates formation of sediments and sludge formation well below 0.8 or 0.65 wt. % *for each stage*. Thus, claims 27 and 29 are clearly unobvious.

Accordingly, the rejection of claims 25-28 and 30 and presumably 29 as being obvious under 35 U.S.C. § 103(a) over Evans et al in view of Trueba et al should be withdrawn.

For the foregoing reasons, it is respectfully requested that the rejection of claims 10-30 be withdrawn and this application passed to issue. Prompt and favorable examination is requested.

Respectfully submitted,



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